



Replicated Dryland Cotton Seeding Rate and Planting Pattern Demonstration

Cooperator: AG-CARES - Lamesa Cotton Growers/Texas Agricultural Experiment Station/Texas Cooperative Extension, Lamesa, TX - 2004

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Summary: No differences were observed for percent lint and seed turnouts or lint loan value (Table 1). Lint yields (on a field acre basis) varied from a low of 430 lb/acre (6 seed/row-ft solid planting) to a high of 553 lb/acre (4 seed/row-ft 2x1 planting). After adding lint and seed value, total value/field acre ranged from a low of \$265.21 (6 seed/row-ft solid planting) to a high of \$351.92 (4 seed/row-ft 2x1 planting). When subtracting ginning cost and seed and technology fees, the net value/field acre ranged from a low of \$200.94 (6 seed/row-ft solid planting) to a high of \$295.91 (4 seed/row-ft 2x1 planting), a difference of \$94.97. No significant differences were observed for any of the fiber properties measured (Table 2). These data indicate that significant differences were obtained in terms of net value/field acre due in most part to the planting pattern (solid planting vs. 2x1 skip). The 4 and 6 seed/row-ft solid planting pattern resulted in excessive competition and reduced yield as compared to 4 and 6 seed/row-ft 2x1 planting pattern.

Objective: The objective of this project was to compare yields, gin turnout, fiber quality and economics of 2, 4, and 6 seed per row foot in a solid plating pattern and in a 2X1 planting pattern (plant 2 rows and skip 1).

Materials and Methods:

Variety: AFD 3511R

Experimental design: Randomized complete block with 3 replications

Seeding rate: 2, 4, and 6 seed/row-ft in 40-inch row spacing (John Deere MaxEmerge vacuum planter)

Planting patterns: Each seeding rate was planted in a solid pattern and in a plant 2 rows

and skip 1 pattern. For ease of planting, all plots were seeded in a solid pattern and, after seedling emergence, cultivator sweeps were used to destroy seedling plants in the skip row.

Plot size: 16 rows by 260 ft long

Planting date: 8-June (dry planted, did not emerge until after 18-June rainfall)

Weed management: Treflan was applied preplant incorporated at 1.25 pt/acre on 26-January. Roundup WeatherMax was applied on 12-July at 22 oz/acre with 17 lbs/100 gallons of ammonium sulfate. Plots were cultivated one time on 22-July.

Rainfall:

April:	1.53	July:	2.52"
May:	0.07"	August:	2.14"
June:	1.84"	September:	5.86"

Total rainfall: 13.96"

Insecticides: No insecticides were applied at this site. This location is in an active boll weevil eradication zone, and one application was made by the Texas Boll Weevil Eradication Program.

Fertilizer management: No fertilizers were applied at this site.

Harvest aids: GramoxoneMax was applied at 10 oz/acre on 9-November.

Harvest: Plots were harvested on 1-December using a commercial John Deere 7445 with field cleaner. Harvested material was transferred into a weigh wagon with integral electronic scales to determine individual plot weights. Plot yields were adjusted to lb/acre.

Gin turnout: Grab samples were taken by plot and ginned at the Texas A&M Research and Extension Center at Lubbock to determine gin turnouts.

Fiber analysis: Lint samples were submitted to the International Textile Center at Texas Tech University for HVI analysis and USDA loan values were determined for each plot.

Ginning costs and seed values: Ginning costs were based on \$2.25 per cwt. of bur cotton and seed value/acre was based on \$125/ton. Ginning costs did not include checkoff.

Seed and technology fees: Seed and technology fees (Table 3) were based on the 2, 4, and 6 seed/row-ft and the 2 x 1 skip row pattern (66.6% of solid planting rate).

Results and Discussion:

No differences were observed for percent lint and seed turnouts or lint loan value (Table 1). Lint yields (on a field acre basis) varied from a low of 430 lb/acre (6 seed/row-ft solid planting) to a high of 553 lb/acre (4 seed/row-ft 2x1 planting). After adding lint and seed value, total value/field acre ranged from a low of \$265.21 (6 seed/row-ft solid planting) to a high of \$351.92 (4 seed/row-ft 2x1 planting). When subtracting ginning cost and seed and technology fees, the net value/field acre ranged from a low of \$200.94 (6 seed/row-ft solid planting) to a high of \$295.91 (4 seed/row-ft 2x1 planting), a difference of \$94.97. No significant differences were observed for any of the fiber properties measured (Table 2). These data indicate that significant differences were obtained in terms of net value/field acre due in most part to the planting pattern (solid planting vs. 2x1 skip). The 4 and 6 seed/row-ft solid planting pattern resulted in excessive competition and reduced yield as compared to 4 and 6 seed/row-ft 2x1 planting pattern. Also, some inclement weather was encountered with low intensity rainfall and low wind at this location prior to harvest. However, no substantial yield losses occurred. Additional multi-site and multi-year applied research is needed to evaluate seeding rates and planting patterns across a series of environments.

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Table 1. Harvest results from the replicated dryland cotton seeding rate and planting pattern demonstration, AG-CARES, Lamesa, TX 2004.

AFD 3511R 4450 seed/lb	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed-tech fee	Net value
	%	%	lb/acre	lb/acre	lb/acre	\$/lb	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre
4 seed/ft 2x1	29.3	51.3	1889	553	968	0.5248	291.41	60.51	351.92	42.50	13.51	295.91 a
6 seed 2x1	29.2	50.1	1774	518	889	0.5130	265.11	55.52	320.63	39.91	20.26	260.46 ab
2 seed/ft 2x1	29.3	51.3	1619	475	831	0.5198	246.86	51.94	298.80	36.42	6.75	255.63 ab
2 seed/ft solid	30.0	51.1	1493	449	764	0.4967	222.91	47.74	270.64	33.60	10.13	226.92 bc
4 seed/ft solid	28.9	49.5	1573	454	778	0.4945	224.68	48.65	273.33	35.39	20.26	217.68 bc
6 seed solid	28.5	49.7	1506	430	748	0.5088	218.46	46.75	265.21	33.88	30.39	200.94 c
Test average	29.2	50.5	1642	480	830	0.5096	244.91	51.85	296.76	36.95	16.88	242.92
CV, %	3.8	4.7	8.2	8.2	8.2	4.4	10.8	8.2	10.2	8.2	--	11.4
OSL	0.6739	0.8460	0.0274	0.0240	0.0183	0.5340	0.0409	0.0182	0.0344	0.0273	--	0.0183
LSD 0.05	NS	NS	245	71	124	NS	48.10	7.70	55.24	5.51	--	50.16

For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level.

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, NS - not significant.

Note: some columns may not add up due to rounding error.

Assumes:

\$2.25/cwt ginning cost.

\$125/ton for seed.

Value for lint based on CCC loan value from grab samples and ITC HVI results.

Table 2. HVI fiber property results from the replicated dryland cotton seeding rate and planting pattern demonstration, AG-CARES, Lamesa, TX 2004.

AFD 3511R 4450 seed/lb	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32 ^{nds} inches	%	g/tex	%	grade	reflectance	yellowness	color 1	color 2
4 seed/ft 2x1	4.3	33.4	82.0	28.2	6.6	1.7	77.2	9.5	2.3	1.0
6 seed 2x1	4.3	33.0	81.7	27.6	7.1	1.3	76.4	9.5	2.3	1.0
2 seed/ft 2x1	4.3	33.3	81.4	27.6	6.5	1.0	78.1	9.6	2.0	1.0
2 seed/ft solid	4.3	32.3	81.0	28.2	6.9	1.3	76.9	9.3	2.3	1.0
4 seed/ft solid	4.4	32.2	79.9	27.6	7.6	1.7	76.8	9.0	2.3	1.0
6 seed solid	4.3	32.5	81.0	28.2	7.0	1.3	76.6	8.8	3.0	1.0
Test average	4.3	32.8	81.2	27.9	7.0	1.4	77.0	9.3	2.4	1.0
CV, %	3.9	3.1	1.1	3.6	9.6	31.3	1.5	4.9	--	--
OSL	0.8285	0.6357	0.2038	0.8986	0.4207	0.4651	0.5681	0.2794	--	--
LSD 0.05	NS	NS	NS	NS	NS	NS	NS	NS	--	--

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, NS - not significant.

Table 3. Seed and technology expenses* for the replicated dryland cotton seeding rate and planting pattern demonstration, AG-CARES, Lamesa, TX 2004.

AFD 3511R 4450 seed/lb	Seeding rate seed/acre	Seed/lb	Seed/bag	Acres planted /bag	Seed fee \$/bag	Tech fee \$/bag	Total seed and tech fee \$/bag	Seed and tech fee \$/acre
4 seed/ft 2x1	34,850	4500	225,000	6.46	49.40	37.80	87.20	13.51
6 seed 2x1	52,275	4500	225,000	4.30	49.40	37.80	87.20	20.26
2 seed/ft 2x1	17,425	4500	225,000	12.91	49.40	37.80	87.20	6.75
2 seed/ft solid	26,136	4500	225,000	8.61	49.40	37.80	87.20	10.13
4 seed/ft solid	52,272	4500	225,000	4.30	49.40	37.80	87.20	20.26
6 seed solid	78,408	4500	225,000	2.87	49.40	37.80	87.20	30.39
				13068 row-ft/acre for 40" rows				seed drop on 2x1 skip uses a 0.6666 factor